Atik Instruments 16/16HR user manual

Version 2.0 - December 2006

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1 Introduction

Atik Instruments Cameras represents today's affordable and easy way to achieve high quality images with a superior design. This version has new redesigned hardware in order to answer the growing demand in fine quality astrophotography cameras. A wide range of accessories is also available in order to answer the needs of the most demanding astrophotographer.

The product you have purchased is a fine piece of hardware and will bring you many moments of satisfaction, however, in order to maintain the product's quality any changes to the supplied camera and/or accessories without the manufacturer's written permission will void your warranty. Any further development will be available to you through your local dealer or at www.atik-instruments.com.

Please take the time to read this document thoroughly in order to get the most out of your Atik Instruments Camera. After doing so, get out there and discover new worlds…

2 Pack Contents

This pack includes:

- 1- Atik Instruments Camera 16
- 2- Pelican Case
- 3- CD-ROM with Software and manuals
- 4- USB Cable
- 5- Car lighter type power cable
- 6- Dust cover
- 7- 1.25” Nosepiece
- 8- Quick start guide

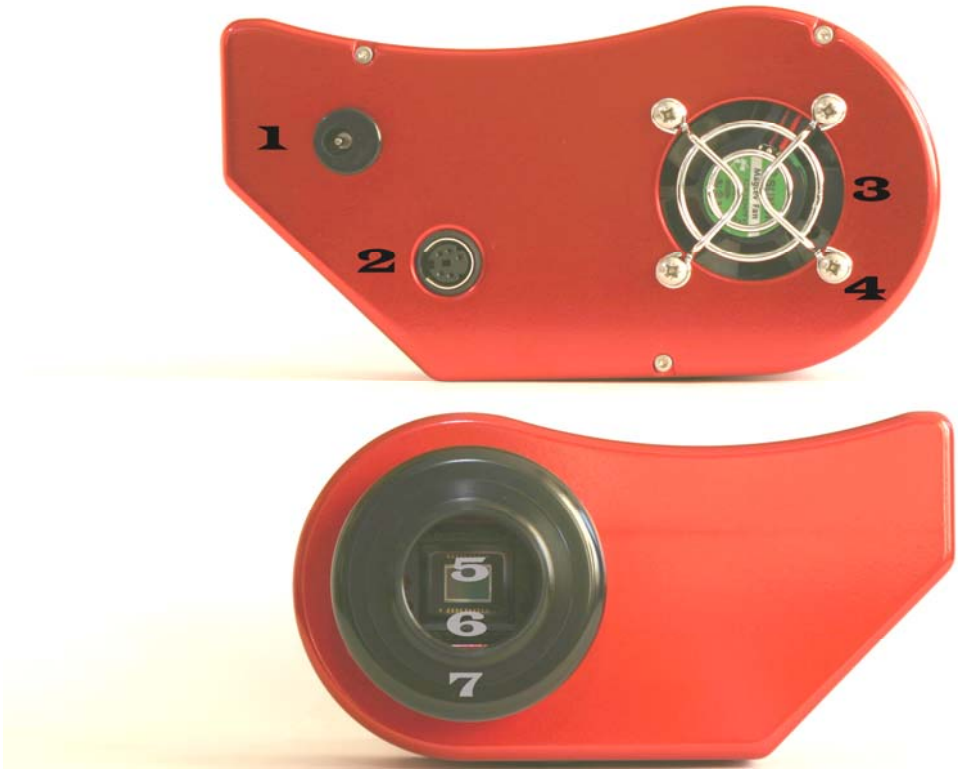
2.1 Pelican Case

The Pelican Case is a high impact resistant case and is used to house your camera and accessories in order to protect them from rough transportation. By carrying the contents of this pack inside the provided case, Atik Instruments assures you that practically nothing will damage your camera and accessories. The inside foam prevents scratches on your camera as long as accessories are not physically in touch with it. Please use the camera in the proper part of the case with no accessories around it.

Note: To prevent accidents please always check that the Pelican case's locks are in fact locked.

3 Atik Instruments 16/16HR

3.1 Camera Parts



- 1- Power socket
- 2- MiniDIN Port
- 3- Cooling Fan
- 4- Cooling Fan protector
- 5- CCD
- 6- Optical window
- 7- 1.25” Nosepiece

- 8 - Tripod Socket
- 9 - Auto Guiding Port
- 10- USB Port

3.2 CCD

The used CCD in your camera depends on the model and on the fact if it's a color or black and white camera and also if it is a 16 or 16 HR model. Below is a table showing the CCD used in all four options regarding these two models:

	Black and White	Color
Atik Instruments 16(C)	SONY ICX429ALL	SONY ICX429AKL
Atik Instruments 16 HR(C)	SONY ICX285AL	SONY ICX285AQ

Due to the very clean nature of these CCD's dark frames are in most cases unnecessary. This is due to the low noise which stands at an amazing less than 8 electron RMS.

The optical window used in front of the CCD is a BK7 with BBAR coatings on both sides assuring that no reflection will appear in your image.

3.3 Analog to Digital Converter (ADC)

The Analog to Digital Converter (ADC) is a 16bit ADC. This means that your Atik Instruments 16/16HR camera will allow you to record subtle levels of gray providing you enhanced dynamic range when capturing an image.

3.4 Power Consumption

Your Atik Instruments camera was electrical and electronically designed in order to have low power consumption so your autonomy is enhanced one step further. Versatility is a very important feature since the 12V used by Atik Instruments 16/16HR cameras can be plugged almost everywhere: e.g. car battery or any other source which provides 12V. The less than 800mA that the camera consumes in full operational status provides extended autonomy.

4 Ports

4.1 USB Port

An USB 1.1 connection port is used in Atik Instruments cameras 16/16HR. This might sound as a limitation but there is little importance in this fact. Although Atik Instruments is aware that USB 2.0 is faster, USB 1.1 suffices if you take certain facts into consideration. The first is that if you have to do serious astrophotography you will note that 16 seconds – which is the time needed to download the entire file in maximum resolution – is a very small percentage of the time consumed in the field if you take into account the time needed to set up the rest of your gear. Take setting up, focusing and a single long exposure for instance. Having this summed up, if everything goes well – really well – an hour is easily consumed. Now take that time and compare 16 seconds against it. On a per cent base this is 0.44% of that time –Not even 1%! -and taking this into account is it really that much? No.

4.2 Auto Guiding Port

Atik Instruments 16/16 HR cameras are compliant with this industry's demanding features. The auto guiding port enables you to do auto guiding with any ST4 compatible guiding software when using the optional cable. See accessories.
You will find this port schematic on section 6.

4.3 MiniDIN (Serial) Port

The MiniDIN port is a Serial Port following a proprietary protocol. This port will be able to control several useful devices through this single port. Port schematics are available on section 6.

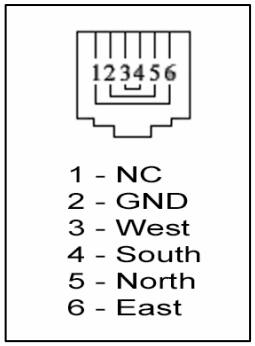
5 Thermal Stabilization

Atik Instruments cameras are thermally stabilized in a way that your CCD will output the best result that it can deliver. This information often appears with the indication ΔT= -x where x in this case is 25. This means that the CCD's temperature will drop 25º C below outside temperature. This is a thermoelectric process and therefore in order to obtain the best results you should wait 1 to 2 minutes until thermal stabilization is achieved. This fact also depends on the outside temperature so, higher environment temperatures will demand more time for the CCD to stabilize. A fan is also included and it is protected by the fan protector.

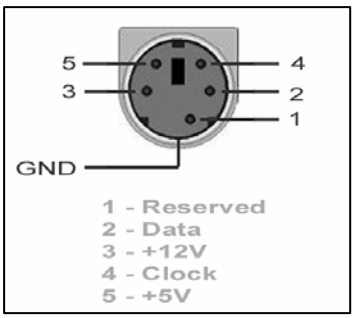
6 Additional Technical Information

Sensor Type	Sony ExView	Sony ExView
Horizontal Resolution	752 pixels	1392 pixels
Vertical Resolution	582 pixels	1040 pixels
Pixel Size	8.6 uM x 8.3 uM	6.45 uM x 6.45 uM
ADC	16 bit	16 bit
Readout Noise	8 e-	6 e^-
Interface	USB	USB
Power	12v DC 0.8A	12v DC 0.8A
Maximum Exposure Length	Unlimited	Unlimited
Minimum Exposure Length	1/1000 s	1/1000 s
Guide Port	ST-4 compatible	ST-4 compatible
Cooling	Thermoelectric	Thermoelectric
Weight	Approx. 500 g	Approx. 500 g

Pinouts for the external ports:



Autoguider port



Expansion Port

Distance from top of T-thread to focal plane: Atik 16 - **Aprox 15mm**
Atik 16HR – **Aprox 18mm**

Optical window thickness: **2mm**

The following table refers to the angular resolution per pixel with certain focal distances. The formula to calculate any other focal length not described is:

*Pixel Size (mms) / Focal Distance (mms) * 206,3 = result in arc seconds/pixel (angular resolution)*

Focal Distance	Angular Resolution	
	16	16HR
350	4,9807	3,8018
400	4,3581	3,3266
450	3,8739	2,9570
500	3,4865	2,6613
550	3,1695	2,4193
600	2,9054	2,2177
650	2,6819	2,0471
700	2,4903	1,9009
750	2,3243	1,7742
800	2,1790	1,6633
850	2,0509	1,5655
900	1,9369	1,4785
950	1,8350	1,4007

Focal Distance	Angular Resolution	
	16	16HR
1000	1,7432	1,3306
1100	1,5848	1,2097
1200	1,4527	1,1089
1300	1,3410	1,0236
1400	1,2452	0,9505
1500	1,1622	0,8871
2000	0,8716	0,6653
2500	0,6973	0,5323
3000	0,5811	0,4435
3500	0,4981	0,3802
4000	0,4358	0,3327
4500	0,3874	0,2957
5000	0,3486	0,2661

7 Software Development Kit

Due to the fact that our ever changing World is always finding new applications for Atik Instruments cameras, a software development kit is available at www.atik-instruments.com . This SDK is free of charge for now.

8 Accessories

There are several accessories from Atik Instruments that will allow you to go further into this never ending journey of discovering new worlds. These include the following

- IR Filter
- Focal Reducer 0,5x
- Manual Filter wheel
- SLR Lens adapter for Nikon
- SLR Lens adapter for Pentax S, K
- SLR Lens adapter for Olympus

Other accessories will follow up very shortly, which will enhance even further the joy of astrophotography.

9 Artemis/ATK Capture

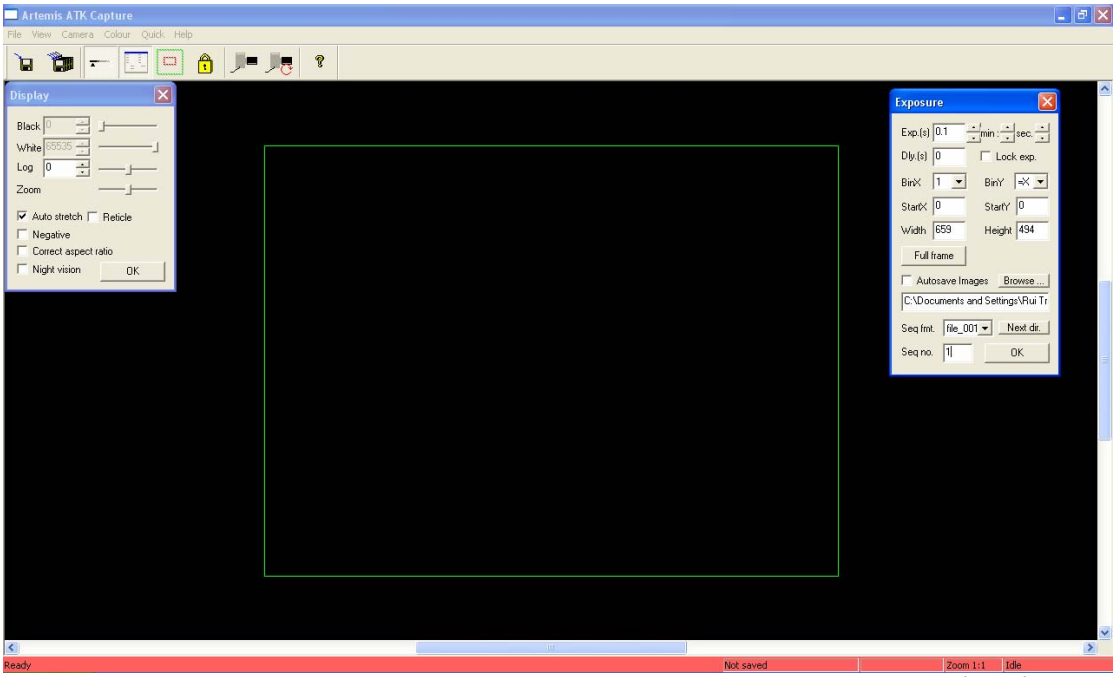
Artemis/ATK Capture is a standalone program which allows you to control your Atik 16 camera, take images, preview them, and save them to standard FITS files. It does not perform any image processing, other than simple histogram manipulation for mapping the 16-bit images to the display.
The data saved in the FITS file is exactly what is read from the camera (raw), so any adjustment is purely for display purposes.
Focus should be very easily achieved with focus assist as described further.

9.1 Features

The capabilities of Artemis/ATK Capture include:

· Control over exposure time, from 1milisecond (0,001s) upwards.
· Control over pixel binning.
· Selection of an image sub-frame for rapid focusing.
· Automatic capture of a series of images, saved with sequential file names.
· Adjustment of black and white levels, and log stretch for displaying images.
· Focus Assist option using data gathered from star images
· Zoom feature.
· Display adjusted for aspect ratio for sensor whose pixels aren't square.
· Night-vision mode.

9.2 Using Artemis Capture



The main Screen

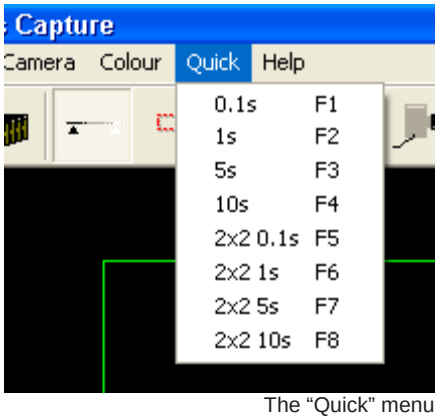
When you first start the program, you will be warned if your Atik 16/16HR camera is not connected or powered up. It is possible to run the program without the camera by clicking on “ignore”, although most of the functions will be unavailable.

The main settings in Artemis Capture are controlled using two dialogs, the ‘display options’ dialog and the ‘exposure settings’ dialog. Both of these are a modeless dialog, which means that they can be left open while you run the program and capture images, etc. However you should be aware that if one of these dialogs is selected then certain keyboard shortcuts or mouse operations in the main window may not behave as expected. If this happens, simply click on the main window to select it.

9.3 Quick Start

If you want to simply take a quick shot to verify that the program and camera are working correctly, you can use the F1-F8 buttons to take a single test image. F1-F4 take an exposure of 0.1, 1, 5 or 10 seconds respectively, and F5-F8 use the same exposure times but binned at 2x2 for greater sensitivity. Here's a list of shortcuts:

F1: 0,1s
F2: 1s
F3: 5s
F4: 10s
F5: 0,1s (binned)
F6: 1s (binned)
F7: 5s (binned)
F8: 10s (binned)



The "Quick" menu

9.4 Main Screen

The main window in Artemis capture is used for displaying the most recently captured image. A green outline rectangle is displayed in the window, indicating the full size of the CCD sensor. If a sub frame is being used for imaging then it is indicated by a red outline rectangle within the green one.

You can scroll the display using the scrollbars, or by dragging it with the left mouse button. Dragging the right mouse button within the CCD area allows you to set the sub-frame interactively. If you have a mouse with a wheel, you can use the wheel to zoom in and out - the point beneath the mouse pointer is the 'focus' of the zoom, and remains in the same place on the display.

Sub-Frame selection

9.5 Exposure Settings Dialog

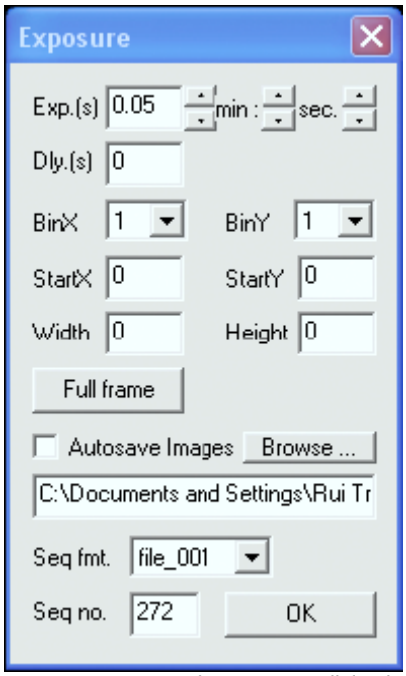
This dialog is displayed by selecting the 'View |Exposure Settings' menu option, or by clicking the toolbar button. Here you are able to set the exposure time for the image, the individual X and Y binning factors, and you can numerically specify a sub-frame if you wish.

Also, a delay between exposures setting is available, since it is desirable to have the auto guider stabilize before starting the next exposure. This can be set in the "Delay(s)" box, and it's measured in seconds.

If the Autosave box is checked then every time an image is captured, it will automatically be saved as a FITs file with a sequence number appended to its name, in the form C:\Artemis_001.fit.

Once you have selected the exposure settings, you can take a shot using the Camera |Snapshot' menu option, or by clicking the camera toolbar button. The indicator at the bottom right of the window shows the current camera status - exposure time remaining, download state, etc.

Once the image is downloaded it will be displayed on the main screen you can adjust the display using the 'Display Options' dialog.



The Exposure dialog box

9.6 Notes on the ATK-16 camera

If your camera is the ATK-16 model (not the “HR” model), the CCD sensor is of the interlaced type normally used in video cameras (the Sony ICX-429ALL). Because of this, an exposure with full vertical resolution (i.e. Y binning = 1) has to be taken in two fields consisting of odd and even scan lines respectively. These fields are then interleaved to produce the final image.
Due to the time taken to download a field the exposure times of the two fields may not match exactly, in which case some fine horizontal banding may be visible in the image - this effect is reduced at longer exposure times, like 30s and over. The effect is eliminated by stacking a few frames, which you will have to do anyway if using exposures under 60s. For short exposures (less than about 2.4s) the camera will take the two exposures consecutively rather than simultaneously, only starting the second exposure after the first field has been downloaded. In addition, with this type of CCD it is physically impossible to produce true vertical binning at any odd multiple apart from 1. The Artemis driver will simulate the correct binning behavior if such a binning multiple is requested. To attenuate this effect, a “De-banding” filter is available in the Exposure dialog box, which will cancel out most of it.

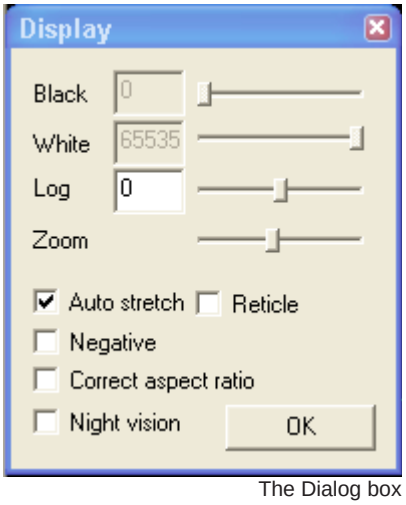
9.7 Display Options Dialog

This dialog is displayed using the ‘View |Display Options’ menu item, or by clicking the toolbar button. It allows you to adjust the way in which the 16-bit image is mapped to the PC’s display. In general, two values are chosen within the range of 16 bit numbers present in the image. Pixel values equal to or less than the lower value are displayed as black, and pixel values equal to or greater then the higher value are displayed as white. Values in between are displayed as shades of grey. The ‘Log’ value controls how the grey shades are distributed – a value of zero produces a linear map, negative values provide higher contrast at the higher end, and positive values boost the contrast at the lower end.

The ‘Auto stretch’ box allows the program to automatically adjust the black and white levels each time an image is captured. The levels are chosen such that only a few pixels fall outside the range. If the box is unchecked then you can manually adjust the black and white levels using the sliders.
The ‘Reticle’ checkbox will add a reticule to the displayed image. It may be of use for determining the center of the frame, so that you can align your goto telescope, for example. The ‘Negative’ checkbox will display the image as a negative, which can be useful when trying to spot faint objects on a dark background.

The ‘Correct aspect ratio’ box adjusts the displayed image according to the physical dimensions of the pixels on the CCD sensor. If the box is checked

then the height of the displayed image is scaled so that a square area on the screen corresponds with a square area in the sky.



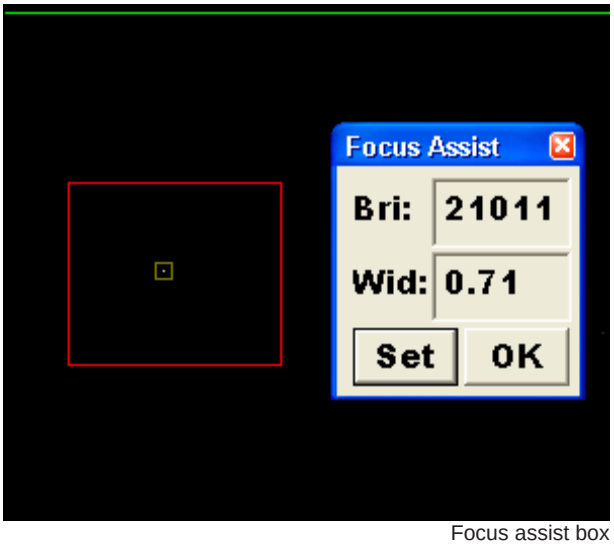
The Dialog box

'Night Vision' changes the Windows colors to shades of red, in order to help preserve visual dark adaptation when using the program at night. When the program shuts down, or the box is unchecked, the original colors are restored. [Hint: You can save the night vision color scheme for use with other programs, if you click the checkbox and then right-click the Windows desktop, select 'Properties |Appearance' and then 'Save as'.
Give the scheme a name such as Night Vision and you can then return to it any time you like using this dialog. You may also want to save your standard color scheme, so that you can re-select it after using the Night Vision scheme.]

9.8 Focus Assist

When taking an astronomical image it is critical that focusing be as accurate as possible. To help achieve this, Artemis Capture provides the Focus Assist dialog.
When you have the camera roughly focused so that you can see stars in the captured image, you can activate the focus assist dialog by double-clicking on a star. For best results you need to choose one which is bright but not overexposed, and which has a relatively clear area around it. The program will select the brightest star in the vicinity of the selection, and draw a small box around it. It will also pop up a dialog showing some information about the Star's image, in a large bold font so that you can read it when at the telescope which may be some distance from the PC monitor.

The information provided is the star's maximum brightness (the difference between the brightest pixel and the background level), and the width of the star image. This is calculated as the size of a square, centered on the star's centroid, containing half the total flux from the star. The objective is to adjust the telescope's focus until the brightness reaches a maximum and the width reaches a minimum - this will give the sharpest and brightest star images.
Whilst focusing it is also a good idea to select a sub frame around the star in order to reduce the image download time, and use the zoom feature so that the Star is displayed highly magnified so you can verify that the image quality is improving as you adjust the focus. Then use the camera 'loop' button to repeatedly take images until you reach perfect focus as indicated visually and with the Focus Assist dialog.



Focus assist box

Artemis Capture tracks the star from one exposure to the next by searching for the brightest pixel in the area around the star's previous location. Depending on the magnification and stability of the telescope, the star may drift by a number of pixels from its previous location. Clicking the 'Set' button in the Focus Assist dialog allows you to specify how many pixels the program will search around the previous location when trying to locate the star. You can also specify the radius that will be used to measure the star's properties

once it is located - this should be a little larger than the radius of the star, but smaller than the distance to the next star.

9.9 Colour cameras and the ArtemisRGB utility

Basically, the Colour version of the Atik 16 cameras is the same as the monochrome counterparts, both in aspect and functionality. However, they feature a CCD which has colour filters built in, enabling the capture of colour images in a single exposure.
Artemis Capture handles these cameras just like the monochrome versions, but features a menu dedicated to colour imaging.

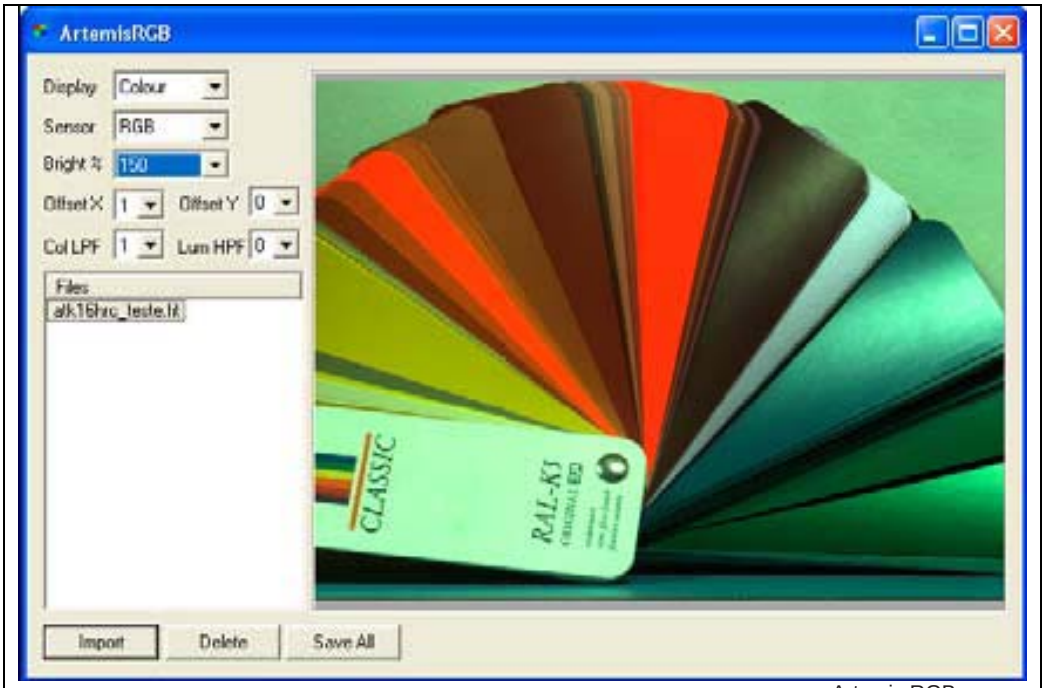
The “Colour” menu has 3 options:

RAW - Displays the image as it comes from the camera
Colour - Displays a synthesized colour image from the RAW data
Luminance - Displays the Luminance channel of the image (grayscale)

Keep in mind that all these options only affect the way the image is displayed. Images are always saved as RAW data. Since images are saved in RAW data, there is a need to decode colour data for further processing. That’s where the ArtemisRGB utility enters.
ArtemisRGB is a standalone application designed to work with FITs files produced from Artemis cameras fitted with colour CCD sensors. The CCD sensors in these cameras have a matrix of colour filters over the sensor elements, so each pixel samples a certain colour of the image. The function of ArtemisRGB is to take this raw image and convert it into a full-color image.

Features:
· Conversion of images from Primary (RGB) and Secondary (CYMG) mosaics
· Allowance for offsetting image on matrix
· Adjustable low-pass filtering of colour
· Adjustable high-pass filtering of luminance
· Adjustable image brightness
· Apply same conversion settings to a batch of images
· View raw image, colour version, or luminance (grayscale) only
· Output in various formats for post-processing, including FIT, TIF, BMP

When you start ArtemisRGB, you will see the main image preview area occupying most of the window. On the left is a list which will contain the names of all the images to be processed.
Above this are some controls for specifying how the processing is performed, and at the bottom are buttons for dealing with files.



Artemis RGB screen

To import a file, click the 'Import' button and locate a FITs file produced by a colour camera. The name of the file will appear in the list box on the left, and the image will appear in the preview window. It may not look quite right at this stage! The 'Delete' button can be used to remove an image from the list - it does not delete it from the hard disk. At the top left is a combo box where you can select whether to view the raw, colour, or luminance image. The raw image will show you the checkerboard matrix pattern, but for now we want to see the colour image. Below this combo box is another one in which you can select whether the CCD uses a primary (RGB) or secondary (CYMG) matrix. The ATK-16HRC uses an RGB matrix; the ATK-16C uses a CYMG matrix. Choose the appropriate one for your camera. If you saved the file from a recent version of Artemis Capture, the colours should already be correct.

Otherwise you can try adjusting the X and Y offset values, which tell ArtemisRGB where on the matrix the top left corner of the image lies. For a full-screen image in the standard orientation these values ought to be 0, 0 - but if the image has been rotated or flipped then the values will need adjusting. With a bit of trial and error you should find values that give the correct colours.

Most deep sky targets are very faint, and because ArtemisRBG doesn't have any histogram stretching tools, a "Brightness" selection is available, which will allow you to increase the image brightness. This will help to better see the object in the image, but won't change the image in any way, since it's for display purposes only.

Because some information is lost when the CCD samples the signal into different colours, reconstructing the full colour image can sometimes introduce colours which weren't present in the original scene. These are typically seen in regions of high contrast. To help reduce these false colour artifacts, you can

run a low-pass filter (blur) on the colour channel. Then, to restore sharpness to the image, you can run a high-pass filter (sharpen) on the luminance channel.

If you have multiple images loaded into ArtemisRGB, you can give each one its own set of processing options if you need to. In particular if some images were saved from a sub frame, then you may need to give them different X or Y offsets. If you make a multiple selection in the image list, the controls at the top of the program will indicate any values which are common to all selected images. If values differ between images then they will be displayed as '---' in the controls. Changing any value will update that value in all selected images - this can be a quick way to set the processing parameters for a batch of images.

Finally, when you have set all your images as you like them, you can use the 'Save All' button to convert all the images to a file format suitable for post-processing. You can choose to save as separate Red, Green and Blue FITs files, or a single 3-layer FITs file, or a 48-bit uncompressed TIFF file, or a 24-bit BMP file. The last option will lose information, but is more compact and more widely used than the other formats. When using the first option each image is saved under its original filename, with _R, _G or _B appended to indicate the colour channel.

9.10 Other controls

There are a few other controls apart from the dialogs described above. The most important are probably the ‘Camera |Snapshot’ and ‘Camera |Loop’ menu options, also available as the two toolbar buttons (the ‘loop’ button is the one with the red circular arrow on it). The Snapshot command takes a single image, and the Loop command starts the program taking repeated images. You can abort the current exposure by clicking the Snapshot button while the exposure is in progress. If you want to terminate the exposure early but keep the result, hold the shift key down while you click the Snapshot button. When looping, you can stop the whole looping process by clicking the Loop button again. The current exposure will be aborted. You can change exposure settings while looping, but they will not be acted upon until the start of the next exposure.
‘Camera |Subframe’ or the red square toolbar button allows you to drag an imaging sub-frame using the left mouse button, which is normally used to scroll the display. You can always use the right mouse button to create a sub-frame. The green square toolbar button, or the ‘Camera |Fullframe’ option, will revert to using the full CCD area for imaging.
‘Camera |Rotate 180’ will rotate captured images 180 degrees. This also rotates the saved image.
‘Camera |Info’ gives some details of the Atik camera.
‘Camera |Connect’ and ‘Camera |Disconnect’ will connect or disconnect the Atik camera.
‘File |Fits header’ allows you to specify the target object, telescope, and observer name for recording in the header of saved FITs files.
The ‘Quick’ menu options allow you to take an instant snapshot at a variety of exposures and binning levels, with a single click or key press.

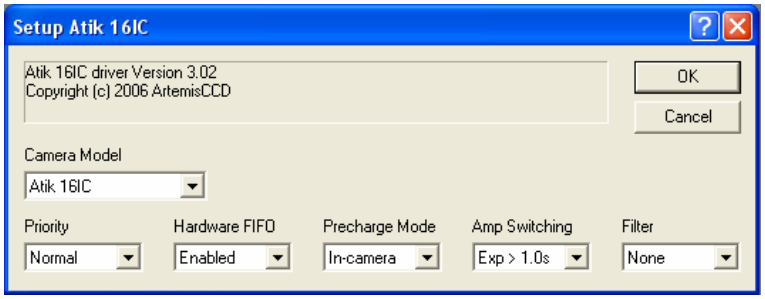
10 Maxim DL™ plug-in

Introduction

Maxim DL is a powerful astronomical program, from Diffraction Limited. It is able to control most of the equipment used in astronomical imaging, as well as processing the captured images. In order to allow Maxim DL to communicate with a new piece of hardware, a driver is required to be installed in a location known to Maxim DL.

Installation

The driver file for the Atik16 camera is located under the "\Plug-ins\MaximDL" folder on the CD-ROM. To install it, just double click on the "SetupArtemisMaxim.exe" and follow the prompts. Be aware that you will need top have Maxim DL installed first.



Using the Plug-in

Once the driver is installed, you can start up Maxim DL and open the CCD Control Window - either by pressing Ctrl+W or by selecting menu option View|CCD Control Window. There may be a short pause while Maxim DL build up a list of available camera drivers, and then you will see the camera setup dialog.
In the box headed 'Main CCD Camera', click the 'Setup' button, and in the dialog which appears scroll down the 'Camera Model' list until you find the "Artemis" camera. There will be five boxes at the bottom of the dialog:

- **Priority**

In order not to 'lock up' Maxim DL while the driver receives data from the camera, a separate process is created for receiving the data in the background while Maxim DL deals with other things such as the user interface. On a slower PC, or one which is particularly busy, it is possible that insufficient time may be available for the download process resulting in stalls during the data transfer. This is undesirable since it may produce artefacts in the image, and so the option is given to increase the priority of the download process. This option will not normally be required, but is provided as a last resort.

- **Hardware FIFO**

The Atik 16 camera is fitted with an internal FIFO (First In, First Out) buffer to smooth the transfer of data from the CCD to the USB. It should be enabled all the time.

• **Precharge mode**
Here you can select the manner in which the CCD's precharge level is subtracted from the image data. 'None' returns data without subtracting the precharge level - this is the fastest option but will result in some image noise. 'PC' sends the image and precharge data to the PC for subtraction - this is the method which results in the least noise, but takes up twice the USB bandwidth. 'In-camera' subtracts the precharge data in the camera's firmware, giving an image which is almost identical to the 'PC' subtraction, but using half the USB bandwidth.

• **Amp off for exposures longer than (seconds)**
This option allows you to set threshold exposure duration - for exposures longer than this, the driver will switch off the CCD's internal amplifier during the exposure. Leaving the amplifier switched on can cause a slight brightening towards one edge of the image due to a small but detectable amount of infrared radiation ('amp glow') emitted by the circuitry inside the CCD, so it is best to switch off the amplifier for longer exposures. For short exposures the glow is generally insignificant compared to the brightness of the actual subject being imaged.

• **Filter** (only for interlaced CCDs)

This filter is to attenuate the effects of “banding” on interlaced CCDs. It should be used with the Atik 16 (not the 16HR).

11 AstroArt Plug-in

Introduction

AstroArt is a powerful astronomical program, from MSB Limited. It is able to control most of the equipment used in astronomical imaging, as well as processing the captured images. In order to allow AstroArt to communicate with a new piece of hardware, a driver is required to be installed in a location known to AstroArt.

Installation

The driver file for the Atik16IC camera is located under the "\Plug-ins\Astroart" folder on the CD-ROM. To install it, just double click on the "SetupArtemisaa.exe" and follow the prompts. Be aware that you will need to have AstroArt installed first.

Using the Plugin

Once the driver and user interface files have been copied to the correct directory, you can start up AstroArt and open the CCD Control panel by selecting menu option Tools|Plugin Commands|CCD Camera
All being well you will see the camera setup dialog, at the left of which is a drop-down list of supported camera types. Select "Artemis" in this box, and then click "Check CCD" to connect to the camera. If you see the message 'Connection FAILED' then you need to check that the camera is correctly powered up and connected to the USB, and be certain that you have uploaded the correct firmware onto the camera if required. Otherwise, you should see a dialog in which you can configure some settings of the Artemis camera prior to using it:

- **Amp off for exposures longer than (seconds)**

Allows you to set a threshold exposure duration - for exposures longer than this, the driver will switch off the CCD's internal amplifier during the exposure. Leaving the amplifier switched on can cause a slight brightening towards one edge of the image due to a small but detectable amount of infrared radiation ('amp glow') emitted by the circuitry inside the CCD, so it is best to switch off the amplifier for longer exposures. For short exposures the glow is generally insignificant compared to the brightness of the actual subject being imaged.

- **Precharge mode**

Here you can select the manner in which the CCD's precharge level is subtracted from the image data. 'None' returns data without subtracting the precharge level - this is the fastest option but will result in a noisy image. 'Full' sends the image and precharge data to the PC for subtraction - this is the method which results in the least noise, but takes up twice the USB bandwidth. 'ICPS' (in-camera precharge subtraction) subtracts the precharge data in the camera's firmware, giving an image which is almost identical to the 'full' subtraction, but using half the USB bandwidth.

• **Hardware FIFO**
The Atik 16 camera is fitted with an internal FIFO (First In, First Out) buffer to smooth the transfer of data from the CCD to the USB. It should be enabled all the time.

• **High Priority**
In order not to 'lock up' AstroArt while the driver receives data from the camera, a separate process is created for receiving the data in the background while AstroArt deals with other things such as the user interface. On a slower PC, or one which is particularly busy, it is possible that insufficient time may be available for the download process resulting in stalls during the data transfer. This is undesirable since it may produce artefacts in the image, and so the option is given to increase the priority of the download process. This option will not normally be required, but is provided as a last resort.

• **Filter** (only for interlaced CCDs)

This filter is to attenuate the effects of “banding” on interlaced CCDs. It should be used with the Atik 16 (not the 16HR).

Once you have chosen the settings you require, click 'OK' to complete the connection with the Artemis camera and return to the Control Panel. Now you can click on the 'Settings' tab to take a test image - select an exposure time and binning mode, then click the 'START' button. After a while a window will open up containing your Atik 16 image.

If you need to find out more about how to use AstroArt for imaging there is plenty of information, and some tutorials, available from the AstroArt 'Help' menu.